

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

1. (Currently Amended) A liquid discharge apparatus comprising:  
a liquid discharge head comprising a discharge port for discharging liquid;  
a liquid flow path communicating with said discharge port and having a bubble generating region for generating a bubble;  
a discharge energy generating element for generating thermal energy for generating the bubble in the liquid inside said bubble generating region;  
a movable member facing said discharge energy generating element and spaced apart from said discharge energy generating element, an end portion of said movable member situated at an upstream side in the flow direction of the liquid inside said liquid flow path is being fixed and a downstream end of said movable member is being a free end;  
a temperature sensor for periodically detecting, at a predetermined period, a temperature inside said liquid flow path; and  
means for controlling or stopping the driving of said discharge energy generating element by ~~judging that the liquid is not supplied normally, based on a temperature rise per period detected by said temperature sensor~~ estimating that the liquid is no longer being supplied into said liquid flow path, based on data on temperature rise per period, detected by said temperature sensor and printing data.
2. (Canceled).

3. (Previously Presented) The liquid discharge apparatus according to Claim 1, further comprising a driving signal supply means for supplying a driving signal for allowing the liquid to eject from said liquid discharge head.

4. (Previously Presented) The liquid discharge apparatus according to Claim 1, further comprising a conveyance means for conveying the medium to be recorded which receives the liquid discharged from said liquid discharge head.

5. (Currently Amended) A valve protection method ~~of~~ for use with a liquid discharge head having a discharge port for discharging liquid, a heat generating element inside a liquid flow path communicating with the discharge port, a movable member for directing a bubble growing by a film boiling on the heat generating element to a side of the discharge port, and a temperature sensor for detecting a temperature inside the liquid flow path, said method comprising the steps of:

detecting periodically, at a predetermined period, a temperature inside the liquid flow path; and

controlling or stopping the driving of the heat generating element by ~~judging that the liquid is not supplied normally, based on a temperature rise per period inside the liquid flow path, as detected in said detecting step~~ estimating that the liquid is no longer being supplied into the liquid flow path, based on data on temperature rise per period, detected by the temperature sensor and printing data.

6.-9. (Canceled).

10. (New) A liquid discharge apparatus according to Claim 1, further comprising an estimating means for estimating that liquid supply to the liquid flow path has become abnormal, by comparing the data on temperature rise per unit hour detected by said temperature sensor and data on temperature rise determined in accordance with the printing data.

11. (New) A liquid discharge apparatus according to Claim 10, wherein said liquid discharge head is provided with a plurality of sets, each including such a liquid flow path, such a discharge energy generating element, such a movable member, and such a temperature sensor,

wherein the temperature rise data determined in accordance with the printing data corresponds to a ratio of number of said liquid flow paths through which liquid is discharged from said discharge port per unit hour obtained from the printing data with respect to a total number of said liquid flow paths.

12. (New) A liquid discharge apparatus according to Claim 10, further comprising a first memory for storing the data on temperature rise per unit hour detected by said temperature sensor and a second memory for storing the data on temperature rise determined in accordance with the printing data.